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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,479	10/03/2005	Michael R Treat	COL221-227791(A)	6897

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EXAMINER

ROSENAU, DEREK JOHN

ART UNIT PAPER NUMBER

2834

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/27/2006	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/536,479	<b>Applicant(s)</b> TREAT, MICHAEL R	
	<b>Examiner</b> Derek J. Rosenau	<b>Art Unit</b> 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 May 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) ✓   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) ✓<br>Paper No(s)/Mail Date <u>0306</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 34 and 50. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities. In paragraph 11, "Such devices are expected to be have various applications" is grammatically incorrect. In paragraph 34, "steering or directional can be produced" is grammatically incorrect.

Appropriate correction is required.

***Claim Objections***

3. Claims 3 and 18 are objected to because of the following informalities: “flex in harmonic fashion” should be “flex in a harmonic fashion.” Appropriate correction is required.
4. Claims 4, 11, and 19 are objected to because of the following informalities: “move in translational fashion” should be “move in a translational fashion.” Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:
- The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
6. Claims 6, 7, 13, 14, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. These claims all refer to the orientation of “the surface”; however, the claims from which they depend all mention two different surfaces. For example, claim 1 refers to “at least one flat or substantially flat surface” and “a surface,” and claim 5 also refers to “a surface other than horizontal.” Claims 6, 7 then reference “the surface.” It is unclear which of the surfaces of claim 1 and 5 “the surface” is intended to refer to. In claims 13 and 14, it is unclear whether “the surface” is intended to reference “at least one flat or substantially flat surface” of claim 10, or “a surface other than horizontal” of claim 12. For claim 20, it is unclear which surface of claim 16 “the surface” is intended to refer to.

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7. Claims 6, 7, 13, and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The device is not sufficiently described such that it is clear precisely how the device would grip a vertical or upside down surface without falling off.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-21 and 25-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Onishi et al. (US 5134334).

10. With respect to claim 1, Onishi et al. discloses a device (Fig 1) comprising: a flexible substrate (item 3) having at least one flat or substantially flat surface (Fig 1), and a source of vibrational energy (items 6 and 7) that can be applied to said substrate (Figs 6a-6h), wherein the device is capable of translational motion along a surface (column 4, lines 31-61).

11. With respect to claim 2, Onishi et al. discloses the device of claim 1, wherein the vibrational energy is harmonic (Figs 6a-6h).

12. With respect to claim 3, Onishi et al. discloses the device of claim 2, wherein the vibrational energy causes the substrate to flex in a harmonic fashion (Figs 6a-6h).

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13. With respect to claim 4, Onishi et al. discloses the device of claim 2, wherein the source of harmonic vibration imparts vibrations to said substrate to cause said substrate to move in a translational fashion (Figs 6a-6h and column 4, lines 31-61).

14. With respect to claim 5, Onishi et al. discloses the device of claim 1 which can adhere to a surface other than horizontal. The device of Onishi et al. could adhere to surfaces that are slightly off horizontal, with at least friction keeping the device adhered to the surface.

15. With respect to claim 6, Onishi et al. discloses the device of claim 5, wherein the surface (see Figure A below) is vertical.

16. With respect to claim 7, Onishi et al. discloses the device of claim 5, wherein the surface (see Figure A below) is upside down.

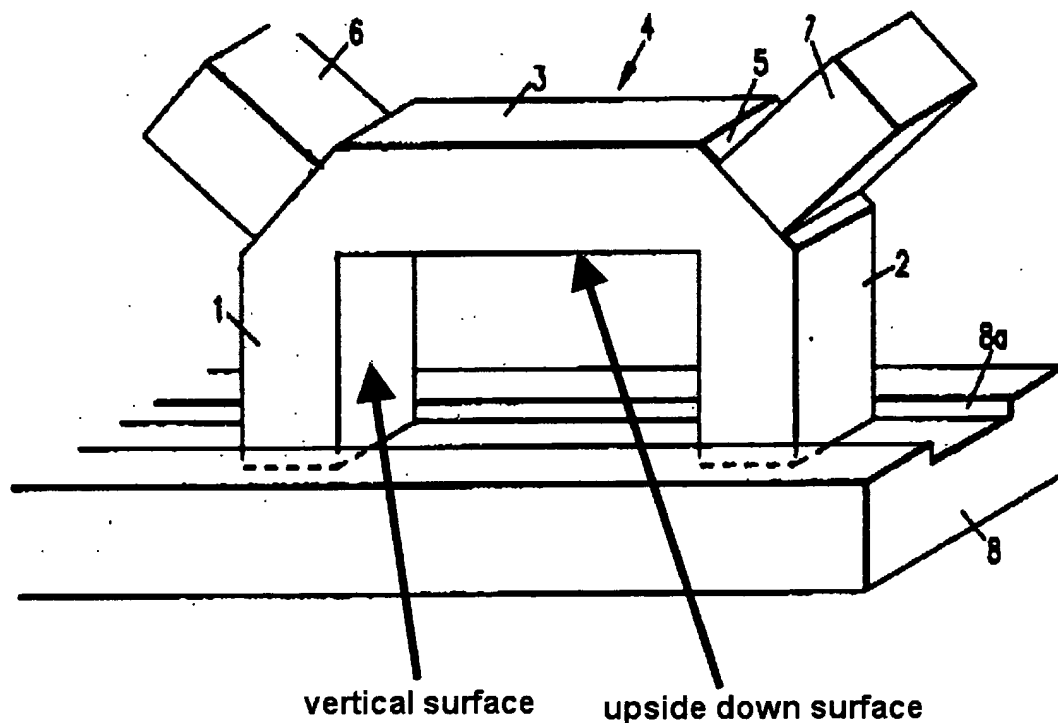


Figure A

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17. With respect to claim 8, Onishi et al. discloses the device of claim 1, wherein a change in the frequency of the vibrational energy causes the direction of the motion of the device to change (column 4, lines 50-55).

18. With respect to claim 9 Onishi et al. discloses the device of claim 1, wherein the vibrational energy is imparted to the substrate to cause the device to adhere to the surface (Fig 1).

19. With respect to claim 10, Onishi et al. discloses a device capable of translational motion (Fig 1) comprising: a flexible substrate (item 3) having at least one flat or substantially flat surface (Fig 1); and a source of harmonic vibration (items 6 and 7) in communication with said substrate (Figs 6a-6h).

20. With respect to claim 11, Onishi et al. discloses the device of claim 10, wherein the source of harmonic vibrations imparts vibrations to said substrate to cause said substrate to move in a translational fashion (column 4, lines 31-61).

21. With respect to claim 12, Onishi et al. discloses the device of claim 10 which can adhere to a surface other than horizontal. The device of Onishi et al. could adhere to surfaces that are slightly off horizontal, with at least friction keeping the device adhered to the surface.

22. With respect to claim 13, Onishi et al. discloses the device of claim 12, wherein the surface (see Figure A above) is vertical.

23. With respect to claim 14, Onishi et al. discloses the device of claim 12, wherein the surface (see Figure A above) is upside down.

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24. With respect to claim 15 Onishi et al. discloses the device of claim 10, wherein the source of harmonic vibration is attaches to the substrate (Fig 1).

25. With respect to claim 16, Onishi discloses a device (Fig 1) comprising: a flexible substrate or surface (item 3); and a source of vibrational energy (items 6 and 7) that can be applied to said substrate or surface (Figs 6a-6h), wherein the device is capable of translational motion along a surface or through a fluid (column 4, lines 31-61).

26. With respect to claim 17, Onishi et al. discloses the device of claim 16, wherein the vibration energy is harmonic (Figs 6a-6h).

27. With respect to claim 18, Onishi et al. discloses the device of claim 17, wherein the vibrational energy causes the substrate or surface to flex in a harmonic fashion (Figs 6a-6h).

28. With respect to claim 19, Onishi et al. discloses the device of claim 17, wherein the source of harmonic vibration imparts vibrations to said substrate or surface (Figs 6a-6h) to cause said device to move in a translational fashion (column 4, lines 31-61).

29. With respect to claim 20, Onishi et al. discloses the device of claim 16 which can adhere to a surface other than horizontal. The device of Onishi et al. could adhere to surfaces that are slightly off horizontal, with at least friction keeping the device adhered to the surface.

30. With respect to claim 21, Onishi et al. discloses the device of claim 16 wherein a change in the frequency of the vibrational energy causes the direction of the motion of the device to change (column 4, lines 50-55).



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31. With respect to claim 25, Onishi et al. discloses a method for imparting translational motion to an object on a surface or in a fluid, said method comprising the steps of: (a) vibrating the object to produce harmonic motion (Figs 6a-6h); (b) coupling the vibration to the surface or fluid in an asymmetrical way to produce translational motion by the object (column 4, lines 31-61 and column 5, line 60 through column 6, line 2)

32. With respect to claim 26, Onishi et al. a method for imparting translational motion to an object having a substrate on a first surface on a second surface or in a fluid, said method comprising the steps of: (a) applying vibrational energy to the object to produce harmonic vibrations in the substrate or first surface (Figs 6a-6h); and (b) coupling the vibrations to the second surface in an asymmetric way to produce translation motion by the object (column 4, lines 31-61 and column 5, line 60 through column 6, line 2).

33. With respect to claim 27, Onishi et al. discloses the method of claim 26, wherein a force in one direction during one part of the wave cycle is not counterbalanced by an equal and opposition force in the other direction (column 4, lines 31-61). Additionally, because the device of Onishi et al. moves translationally, the forces must be unbalanced.

***Claim Rejections - 35 USC § 103***

34. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35. Claims 22-24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi et al. in view of Culp (US 5350966).

36. With respect to claim 22, Onishi et al. discloses the device of claims 1, 10, and 16.

Onishi et al. does not disclose expressly an antisymmetry element.

Culp teaches a piezoelectric device with antisymmetric elements (Fig 10, item 62).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the antisymmetric elements of Culp with the device of Onishi et al. for the benefit of augmenting the propulsive effects (column 6, lines 11-20 of Culp).

37. With respect to claim 23, the combination of Onishi et al. and Culp discloses the device of claim 22. Culp disclose that the antisymmetry element comprises bristles, spines or spicules embedded in a flexible matrix, regular or irregular projections, fins, or a conformable mat (Figure 10, item 62).

38. With respect to claim 24, the combination of Onishi et al. and Culp discloses the device of claim 23. Culp discloses that the antisymmetry element comprises bristles (Fig 10, item 62).

39. With respect to claim 28, Onishi discloses the method of claims 25 and 26. Onishi et al. produces a net force in one direction when averaged over the entire vibratory cycle (column 4, lines 31-61). Additionally, because the device of Onishi moves translationally, there must be an average net force.

Onishi et al. does not disclose expressly an antisymmetry element.

Culp teaches a piezoelectric device with antisymmetric elements (Fig 10, item 62).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the antisymmetric elements of Culp with the device of Onishi et al. for the benefit of augmenting the propulsive effects (column 6, lines 11-20 of Culp).

### ***Conclusion***

40. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Iwata et al. (US 4953413) discloses a piezoelectric device that produces translational motion by vibrating a substrate. Uchine et al. (US 4857791) discloses a piezoelectrically driven linear motor in which the piezoelectric element acts on a flexible substrate to produce translation. Xu et al. (US 7045932) and Yoshida et al. (US 6188161) disclose piezoelectric linear motors in which vibrations of the piezoelectric elements cause translation along a surface, wherein the surface can have any orientation, including vertical and upside down.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek J. Rosenau whose telephone number is 571-272-8932. The examiner can normally be reached on Monday thru Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Derek J Rosenau  
Examiner  
Art Unit 2834

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